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ABSTRACT

Four groups of students were compared on cumulative grade point average, total credit hours attempted, and differences between predicted and actual grade point average (GPA). The four groups of students were formed by the semester in which they declared a major: students declaring in the third semester made up one group, those declaring in the fourth semester made up another, those declaring in the fifth, and those not declared by the fifth semester were the last groups. Early declarers tended to take more hours, achieve better in those heavier loads and achieve beyond predicted levels; whereas late declarers took fewer hours, had lower levels of achievement and tended to perform below predicted levels. For the four groups, means and standard deviations are provided for Scholastic Aptitude Test scores, relative high school rank, cumulative GPA, cumulative hours of college enrollment, and the difference between actual cumulative GPA and predicted cumulative GPA. (SW)

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The Association of Achievement and Date of Declaring a Major

INDIANA STUDIES IN HIGHER EDUCATION

Number Forty-Three

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THE ASSOCIATION OF ACHIEVEMENT AND DATE OF DECLARING A MAJOR

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Abstract

This study compared four groups of students on cumulative grade point average, total credit hours attempted, and difference between predicted and actual GPA. The four groups of students were formed by the semester in which they declared a major: students declaring in the third semester made up one group, those declaring in the fourth semester made up another, those declaring in the fifth, and those not declared by the fifth semester were the last groups. Early declarers tended to take more hours, achieve better in those heavier loads and achieve beyond predicted levels; whereas late declarers took fewer hours, had lower levels of achievement and tended to perform below predicted levels.

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Introduction

It has often been hypothesized that clarity of objectives is important for students in achieving success in college work. However, many students come to college with vague and uncertain goals, and others who initially believe they know what they want to do in college change their minds several times after experiencing the array of academic alternatives available to them.

Definite goals for the college experience, and for life, lead to early declaration of a major area of academic work. It seems, therefore, reasonable that students who declare a major in their beginning semesters will have more definite goals, and will be more motivated, than students who do not declare. The purpose of this study is to trace the academic records of one entering class of students to see if there is indeed a difference in academic performance between those with declared majors, and those without declared majors.

Procedure

The design was to select a given class and follow it over the first five semesters, noting differences in academic performance between students who had declared a major at various points and those who had not declared.

Students were divided into four groups depending on when they selected a major. These four groups were: 1) students who had not recorded a major as of their fifth semester, 2) students who recorded their major by the fifth semester but not before that time, 3) students who had declared a major by the fourth semester but not before that time, 4) students who had chosen their major by the third semester. Since during the freshman year students are all enrolled in the University Division, the declaration of a major before the third semester is of little utility. Therefore, grouping began in the third semester of work, not the first semester.

This study hypothesized that having a definite major would be related to higher academic motivation. The construct of motivation is complex, but at least two academic variables may be seen, in part, as reflecting motivation. Cumulative grade point averages (CGPA's) are, to some extent, an indication of academic motivation, as are the total number of credit hours attempted. Therefore, the four groups were first compared on CGPA's across the five semesters, and then on number of hours of course work taken across five semesters. However, the groups may well differ among themselves on academic talent variables, so first a comparison was made on Scholastic Aptitude Test (SAT) scores and high school rank. Before final CGPA and hours data were tested, an adjustment to CGPA's and cumulative hours was made to compensate for differences among the groups in academic talent factors.

Results

Data were collected on students still enrolled through five semesters beginning with the freshman class that enrolled in the fall of 1976. Since less than fifty of these students had recorded a major during their freshman semesters (as noted above, they are not required to do so, since all first year students are in the University Division) the study actually began classifying students in the first semester of the second year of their enrollment. There were 810 students who declared their major at enrollment in the first semester of the sophomore year. These were designated Group 3. An additional group (2) declared their majors in the second semester of the sophomore year. There were 345 cases in this group. By the fall semester of the third year of enrollment - the last semester included in this study - another 418 students (Group 1) declared a major. The remaining 818 students (Group 0) still had no official major listed on the University's Data Systems files by the start of that fifth semester of enrollment.

Two analyses were done - first, an analysis was made to determine if talent factors appeared relevant - then an analysis was made on students whose files included SAT and high school rank data so that talent factors could be controlled. In the second analysis some cases were lost from each group due to the absence of test scores on their files. Curiously, the largest loss was among the group that was yet undeclared by the fifth semester. This group dropped from 818 total cases to 244 cases who had complete data on their files.

The talent factors were explored first so that if conspicuous differences in talent appeared among the groups, adjustments could be made in the analysis of cumulative grade point averages and in cumulative hours taken.

The SAT data are given in Tables 1 and 2. Here the data show that the four groups are different in SAT Mathematics, but not in SAT Verbal. Post hoc analysis was done on SATM scores, and it was found that Groups 0 and 1 (the undeclared at five semesters, and the undeclared in four semesters) were significantly lower in SATM than the remaining two groups, and that all groups were significantly higher in SATM than Group 0.

Table 1

SATV Means, Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	N	$\bar{X}$	σ	F
0	244	459.26	106.25	
1	338	453.12	88.99	
2	252	469.96	85.60	
3	770	460.84	86.48	
				1.70 n.s.

Table 2

SATM Means, Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	N	$\bar{X}$	σ	F
0	244	480.90	109.38	
1	338	495.50	99.77	
2	252	509.33	99.80	
3	770	506.16	103.13	
				4.61>.01

A second talent factor - relative rank in the high school graduating class - was also analyzed. These data are in Table 3. Again, the data show a statistical difference among groups, and consequently suggest that the four groups are not all from a common population of high school achievers. A post hoc analysis was done on the data, and Group 0 and Group 1 (the nondeclared by five semesters and the non-declared by four semesters) ranked significantly lower in their high school classes than did Groups 2 and 3 - who declared their majors by the second and first semester, respectively, of their first year.

Table 3

Relative High School Rank Means,* Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	N	$\bar{X}$	σ	F
0	227	30.11	22.31	
1	321	28.99	20.46	
2	247	24.71	20.21	
3	745	21.88	17.41	
				16.41>.01

*Rank of 1 is high, range is 1 to 100.

Since the academic talent factors clearly indicate that differences exist among the four declaration date groups, the target data - CGPA's and cumulative hours attempted - were analyzed by first adjusting them statistically in relation to differences in talent factors, then looking at group differences.

Table 4 contains the data on CGPA's. These data are presented in three different analyses: 1) unadjusted and including all students who enrolled five semesters, 2) adjusted but including only those cases that had SAT data on file in Data Systems, and 3) adjusted for talent factors, and, of course, including only those cases who had SAT data. The first of these analyses was done to see what the data on all cases looked like. The second and third were done to compare adjusted and unadjusted outcomes for the same students.

Table 4

Cumulative GPA Means, Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	$\bar{X}$*	σ	$\bar{X}$**	σ	$\bar{X}$***
0	2.19(818)	.88	2.56(244)	.74	2.56(244)
1	2.63(418)	.60	2.69(338)	.54	2.69(338)
2	2.76(345)	.61	2.82(252)	.54	2.82(252)
3	2.88(810)	.53	2.90(770)	.52	2.89(770)
F	148.96>.01		25.65>.01		13.35>.01

* unadjusted, all cases
** unadjusted, cases with complete data
*** adjusted for talent factors, cases with complete data

In Table 4 the data show several interesting points. For example, even with adjustment the differences among the four groups in CGPA's were significant. A direct progression in size of mean CGPA's is evident as one moves from early declarers (Group 3) to late declarers (Group 0). Adjusting the means for talent factors has some slight effect, but

there is still a difference of a third of a grade point - roughly three-fifths of a standard deviation - between early and late declarers. This difference is approximately ten percent of the total range of CGPA's in normally distributed data with the standard deviation cited in Table 4.

Another interesting point in Table 4 deals with the effect of excluding students whose records did not include SAT data. By far the largest number of these students were in the nondeclared group, and were among the lower achievers of that group. This is shown in the fact that the mean for nondeclarers moved from 2.19 with all students to 2.56 with only students who had complete data on file.

And lastly, it is interesting to note that although some differences were found in talent indicators among the four groups (Tables 2 and 3), adjusting the cumulative grade point averages for talent factors made very little difference within the two decimal points carried with CGPA's. Apparently the difference in talent factors is sufficiently small that they are of little consequence when comparing the groups on CGPA's. This hypothesis seems reasonable when Tables 1 and 2 are given a closer scrutiny. The differences among groups in SATV are within the chance range; the differences in SATM, while significant beyond chance, are quite modest when one considers the total range of SAT scores (200-800). A similar conclusion can be made for the relative ranks in the high school classes (Table 3).

One additional approach was used to illustrate the relationship between semester of declaring a major and grade achievement. Each semester the CGPA's of declared students was plotted with the CGPA's of students yet undeclared. Obviously, as the semesters progress, students in the nondeclared group will move to the declared group, so while one group (declared) started small and ended large, the other group (nondeclared) started large and ended small. Nevertheless, the plotting of data on the two groups each semester was contrived in the hope of showing differences in achievement associated with declaration of a major.

Figure 1 shows the plot of CGPA's of declared and undeclared students. The data for the first two semesters is

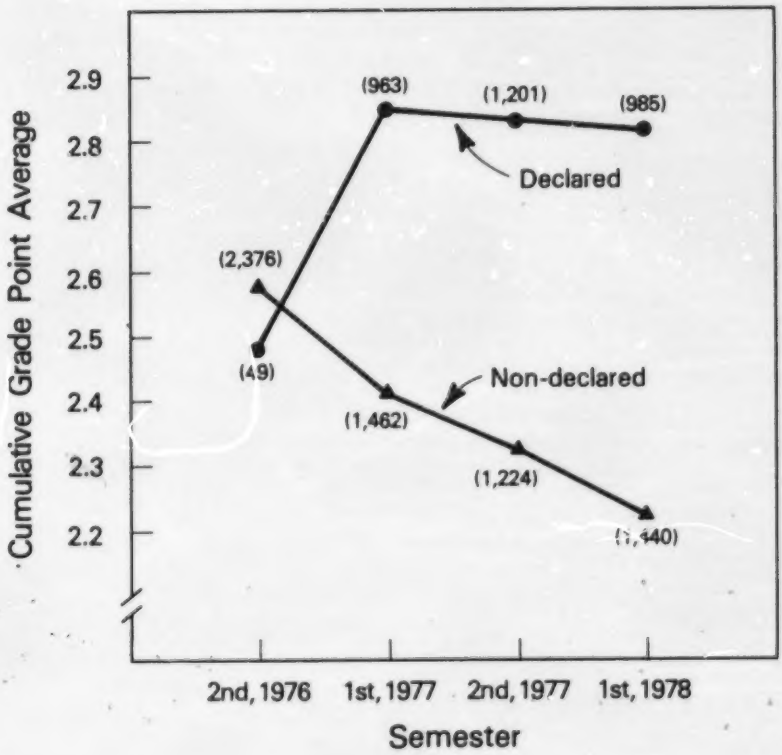

FIGURE 1. CUMULATIVE GRADE POINT AVERAGES FOR DECLARED AND NONDECLARED STUDENTS ACROSS FOUR SEMESTERS (FIGURES IN PARENTHESES ARE NUMBERS OF STUDENTS).

probably least reliable, since less than fifty students had declared - and no one was asked to declare until registration in the third semester. Beyond the first two semesters the figure shows clearly that students with declared majors do better work, and more of it, than students who do not have declared majors.

If differences in CGPA's appear associated with date of declaring a major, under what kind of workload is the above achievement record established for declared and nondeclared students? To attack this question the number of hours in which each student was enrolled was collected for the persons in each of the four declaration groups. These data are provided in Table 5. The data show that the undeclared and late declarers enrolled in *fewer* hours than did early declarers. The difference among declaration groups was significant, indicating greater than chance differences among the groups. The post hoc analysis showed that Group 0 was significantly *below* the remaining groups, and that Group 3 was significantly *above* the remaining groups. Groups 1 and 2 were not different from each other in cumulative hours.

Table 5

Cumulative Hours of College Enrollment Means, Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	N	$\bar{X}$	σ	F
0	244	62.73	19.76	
1	338	68.64	14.91	
2	252	70.98	11.64	
3	770	75.08	9.80	
				62.17>.01

The above findings appear to support the conclusion that persons who declare their majors "early" not only get higher CGPA's, but also take more hours of work in doing it.

On the other hand, persons who declare "late" take fewer hours and achieve only modestly in those fewer hours.

It may appear that undeclared students do not exercise maximum effort in the academic arena. To test this hypothesis an additional technique was employed. First, the CGPA for each student in all groups was predicted from academic talent factors, SAT, and relative high school rank data. Then, for each student, this predicted CGPA was subtracted from the actual CGPA. If a student is performing the way his/her academic talent indicators say he/she should, this residual should be essentially zero. On the other hand, a positive residual would identify students who are achieving *above* the level predicted, while a negative residual would identify students achieving *below* the level indicated by their academic talent indicators.

Table 6

Residual (Actual CGPA-Predicted CGPA) Means, Standard Deviations

(0=Undeclared in 5 semesters; 1=Declared at 5th semester; 2=Declared at 4th semester; 3=Declared at 3rd semester)

Group	N	$\bar{X}$	σ	F
0	244	-.15	.56	
1	338	-.05	.43	
2	252	.01	.43	
3	770	.06	.43	
				12.97>.01

Table 6 shows the mean residuals (actual CGPA minus predicted CGPA) for each of the declaration groups. The data here show that "late" declarers tend to achieve below, while early declarers tend to achieve above, the predicted level. The differences among the groups in their residuals is greater than chance level. These data would suggest that the hypothesis of less than complete involvement on the part of nondeclarers may well be true.

Discussion

The above analysis suggests that the earlier students declare a major the more likely they are to assume a full course of study and to achieve well in that course. It suggests that academic objectives are tied to serious involvement in, and success with, an academic program. But the students in the nondeclared group also seem to come from a history of less involvement. Their high school achievements were also less than was true for students who declared their majors early. Possibly a general academic motivation factor is involved which pervades the entire academic scene. If so, choosing a major, selecting a substantial course load, achieving up to one's talent might all be a reflection of high status on the academic motivation factor. On the other hand, late declaration of a major, lower course loads, and achieving below one's academic potential may reflect low status on the motivation factor. This hypothesis appears interesting, but substantially more work would be required to validate it.

It is interesting to note that a sizable number of the nondeclared students were without SAT data on file. In an earlier study by Brigman and Jacobs (1979) students who dropped out of the University also tended to be without SAT data more often than was true of students who persisted in their programs. Again, the factor of academic motivation appears to emerge here. Students who were low in this motivation not only enrolled for fewer hours and achieved less well, but also failed to get the necessary data on file, and tended to drop out more readily than their more highly motivated colleagues.

To the extent that people are goal-seeking organisms - whether by nature or by learning - it would appear that students who set for themselves a definite academic objective defined by a major course of study would pursue that goal via its shortest route. If this is so, they would not only carry heavier loads but also achieve more success in their work. The data bear this out. It would seem relevant, therefore,

that the University should launch a special effort on behalf of nondeclared students to help them sort out and identify life goals and subsequent academic programs. Such an effort may well result in greater efficiency and success for affected students.

Whatever the validity of the above speculations, it appears that a student without a declared major could profit from the attention of skilled academic counselors. The student appears to need direction and purpose and may well "drift" until such a "rudder" is built to manage his/her own course of action.

Conclusion

The data presented in this study appear to lead to the following conclusions:

1. Students who quickly declare a major produce higher levels of grade achievement than students who are "late" declarers.
2. Students who are "early" declarers take more hours of course work than do "late" declarers.
3. "Late" declarers tend to perform less well than indicators of academic talent suggest they should, while "early" declarers tend to achieve better than talent indicators suggest.
4. A definite counseling program for students who do not declare a major at an early date may change the nature of the above findings by increasing the efficiency of production among "late" declarers.

References

Brigman, S. Leellen; Jacobs, Lucy Cheser, "Persistence/Attrition: A Longitudinal Study of the Freshman Class of 1974," Indiana Studies in Higher Education, No. 41, Bureau of Evaluative Studies and Testing, 1979, 26pp.